

Physics

Nickas, Pantelidis.

Major: Physics courses – 161; 185; 225; 331; 332; three terms of 301; 320 or 340; either 408-409 or 471 (culminating experience).

Cognate courses – Mat 121, 122, 231.

Comprehensive evaluation (written and oral). Total of 9 or 10 major courses, plus 3 cognates = 12 or 13.

Physics 432 is highly recommended to students planning to pursue graduate studies in physics.

Highly recommended: CS 110.

Minor: Physics courses – Any five.

Cognate courses – Mat 121 and 122. Total of 5, plus 2 cognates = 7.

By-pass credit opportunities: Students who are placed directly into 185, General Physics II, and who receive a grade of B or above therein, will receive credit for 161, General Physics I, upon request.

Phy 160. Special Topics.

Phy 161. General Physics I. Mechanics, thermodynamics, wave motion, and sound. Lecture and laboratory. Partially satisfies the Natural World LADR. Prerequisite: Mat 112 or 121, or concurrent enrollment.

Phy 185. General Physics II. Electricity and magnetism, light, relativity. Lecture and laboratory. Prerequisites: Phy 161.

Phy 225. Modern Physics. Experimental and theoretical basis of modern concepts of atomic and nuclear structure and some of their applications. Prerequisite: 185

Phy 260. Special Topics.

Phy 301. Seminar and Advanced Lab. Weekly discussion of current topics in physics; selected experiments and small scale research projects in classical and modern physics. Open to second-semester sophomore, junior, and senior majors and minors in physics. May be repeated for credit. .25 unit.

Phy 307. Directed Study. .50 unit.

Phy 320. Thermal Physics. Temperature and heat, kinetic theory, the laws of thermodynamics with applications, phase space probability distribution and approach to equilibrium, equilibrium ensembles, and ideal quantum gases. Prerequisite: 185.

Phy 329. History of Physics. The evolution of ideas in physics, with philosophical perspectives, from Babylonians and pre-Socratics through Hellenistic years, to medieval times, to Newtonian and post-Newtonian physics and cosmology, to the scientific revolution of modern times. No prerequisites.

Phy 331. Classical Mechanics. Formal introduction to classical mechanics. Newton's laws, symmetry and conservation theorems, central motion, non-inertial reference frames, systems of particles, rigid-body motion, Lagrangian and Hamiltonian formulations, scattering, and oscillations and waves. Prerequisite: 161.

Phy 332. Electricity and Magnetism. Electric and magnetic fields and their interactions with charges and currents. Topics include electrostatics, magnetostatics, electromagnetic properties of matter, Maxwell's equations and electromagnetic waves. Prerequisite: 185.

Phy 340. Optics. Theoretical and experimental study of the properties of light: wave motion, propagation of light in media, geometrical optics, polarization, interference, diffraction, Fourier optics and coherence theory. Prerequisite:185.

Phy 341. Advanced Physics Laboratory. Experiments in upper-level physics topics requiring measurement using optical, mechanical and electrical devices; report writing including standard methodologies and techniques in data handling, analysis and display. Offered alternate years. Prerequisite: Phy 225.

Phy 357. Internship. Off-campus supervised experience in physics.

Phy 360. Special Topics.

Phy 370. Directed Study.

Phy 408, 409. Independent Study. A two-semester equivalent of 471. .50 unit each.

Phy 420. Special Relativity. Space time and reference frames, Lorentz transformations, relativistic effects, Minkowski space and 4-vectors, relativistic dynamics and collisions, relativity and electrodynamics, principle of equivalence. Prerequisite: 185.

Phy 432. Quantum Mechanics. Wave functions and the Schrodinger equation, 1-dimensional problems, uncertainty, angular momentum, central potentials and the Hydrogen atom, Dirac formalism, spin, approximation methods, several-electron atoms. Prerequisite: 331.

Phy 465. Capstone Seminar. Course content will reflect the topic for the annual Capstone. Open to all juniors and seniors and may be repeated once for credit. Students may enroll in only one Capstone seminar in a given term.

Phy 471. Independent Study.

Phy 499. Comprehensive Evaluation.